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to the hook with his left hand, and takes hold of one end while the hook is drawing the remainder through the shed; he then puts down the third treadle Q, its cord R pulling back the roller I, which tightens the counter-cord S, and so moves round the roller M in the other direction; its rod N then returns to the position shewn by the dotted lines, which withdraws the hook P, taking the hair with it, and laying it across the warp.

The hook is kept in its place by two straps T T, under which it freely slides.

While the hook is flying back, the motion of the roller I pulls the lever V by the cord U, and causes the upper end, by means of the string W, to pull the batten forward.

The treadle B is then put down again, and the whole operation repeated.

No. IX.

MACHINERY FOR HOTPRESSING LACE GOODS.

The ***Gold Isis Medal*** *was presented to Mr.* ***Robert M'Ewen****, of High Mark, near Stranraer, for his Machinery for Hotpressing Lace Goods.*

High Mark, near Stranraer,
March 10, 1843.

Sir,

I beg leave to submit to the Society of Arts, &c. the drawings and description of machinery which I invented and made for the purpose of hotpressing lace goods and other light fancy fabrics manufactured from silk or cotton, &c.

In the town of Hamilton, near to Glasgow, there is a particular branch of the lace-trade carried on (said to have been first introduced by the Duchess of Hamilton), which chiefly consists in the designing, printing, and tambouring of fancy figures and devices on silk net for veils, &c. the last process being the pressing and smoothing of the piece, which was formerly done by small hand-irons, the same as are used by laundresses; but, independent of the tediousness of that process, the irons, from the impossibility of heating them to an uniform temperature, frequently injured the colour of the lace, and the operation of pressing with them was also found to be very unhealthy; and for these reasons Mr. D. M'Arthur, the principal lace-manufacturer in Hamilton, desired me to try and devise means to remedy the evils complained of, and which I succeeded in accomplishing by the invention and application of machinery heated by steam. I invented two different machines for the purpose.

It is above ten years since the first one was set to work, and the last one was made since I had the honour of submitting my safety steam-gauge to the notice of the Society; and should my present communication be considered of sufficient importance to merit the approval of the Society, I shall feel grateful for whatever token of their approbation they may please to confer.

I have the honour to be, &c. &c.

To the Secretary of the ROBERT M'EWEN.
Society of Arts.

The machine is composed of a large chest heated by steam, and having the under surface planed and polished. Underneath the chest a strong plate is placed, having its upper surface also planed, to correspond exactly with the face of the chest. The piece of lace being spread out on a thin board, and inserted between the chest and the plate, pressure is speedily and powerfully applied in raising the under plate, by means of a curved wedge or camb, acted upon by a wheel and pinion, in connexion with a fly-wheel and lever on the side of the machine.

A, the frame of the machine, which is firmly bolted down to a foundation of stone; the bed-plate supports the steam-chest B on four columns, with bolts passing up through them, which bind the whole together. The intermediate moveable plate C is held in its place by two guides *d*, bolted to the side of the steam-chest, and is also counterbalanced by two weights *e e*, attached to the end of the levers *f f*, and underneath, in its centre, where the pressure is applied, is a friction-roller *g*, fig. 3, adjustable in a slot, to suit the thickness of the boards *h h*, on which the lace is spread. The steam-chest of the machine is cast in one piece, and strengthened internally by ribs, dividing it into four equal compartments, and having also a plug of metal cast between the plates in the centre of each of the four compartments. The steam is admitted through the column *i* on the top of the chest into the four compartments, each of which is furnished with a stop-cock and pipe *j* leading into a main pipe *k*, which carries out the condensed water. The cocks are fastened to the chest with a single bolt in the same manner as the three-way-cock in the safety steam-gauge, and which I find to be a very simple and effective method of attaching such small things. The object of having a cock on each of the four pipes is for the purpose of blowing the steam through any one compartment of the chest in the event of the passages getting choked with sediment, and the cock on the top of the column serves to admit or withhold the steam from the machine.

At each end of the machine a table *l* is placed for the purpose of spreading out the lace on two boards *h h*, which are connected by cords passing over the pulleys *m m* at each end of the tables, and round the rollers *n n* underneath them, so as to form an endless band, and by turning the rollers *n* underneath the tables, the boards are made to pass alternately from the tables, till, between the plates of the machine, where one board remains under pressure until a piece of lace is spread out on the other and prepared to undergo the operation of pressing, and then the withdrawing of the board from between the plates of the machine brings in the other board to receive the pressure, which, as I have already stated, is applied by means of the fly-wheel *o* and lever *p*, acting on the wedge or camb *q*, of a peculiar construction. *q*, fig. 4, is the place for this camb. Fig. 3 exhibits some of the principal details of the machine, it being an end elevation shewing the method of using the lever in connexion with the fly-wheel; and fig. 5 exhibits, on a larger scale, a view of the wedge or camb, which is keyed on to the main shaft, and acts against the friction-roller *g* underneath the intermediate or moveable plate c. The camb has formed on its circumference two wedges of different degrees of inclination or thickness, as shewn by the dotted lines, the object of which is to combine in one motion *speed and power*, where each is respectively needed. The fly-wheel *o*, having spokes on its circumference similar to the wheel used in steering a ship, is fastened on the end of the shaft *r* with the pinion *s*, which works in the wheel *t* on the main shaft; and on the other end of the shaft *r* the lever *p* is placed (working loose, between two ratchet-wheels *u*, but having a weighted pall or catch which, in a certain position, takes hold of the wheels; the lever has a balance-weight *w* on its end which keeps it in an upright position, and thereby lifts the pall *v* off the wheels by its rising over and resting on the piece *x*, which is bolted to the foot of the column. The plate *y* having a row of holes in it, serves to keep the lever down when the pressure is applied, by inserting a pin into one of the holes above the lever, as shewn on the plan fig. 2.

Two men are required for the proper and expeditious spreading of the lace on the boards, and also for working the machine, one being stationed at each side of the table, and when the lace is inserted between the plates one of the workmen grasps the two upper spokes of the fly-wheel, and by giving it a smart push, sufficient force is generated, aided by the two balance-weights *e e*, to bring up the intermediate plate c on the first wedge of the camb, and which brings the lace in contact with the steam-chest, and then the workman at the other side of the machine, on pulling down the lever *p*, causes the pall *v* to drop on the ratchet-wheels *u*, and, by forcing the lever down, presses in the small wedge of the camb, and keeps it in its place by inserting the pin into a hole above the lever in the plate *y*, and on withdrawing the pin, the lever falls back, and the pall is thereby lifted off the ratchet-wheels, which allows the workman at the fly-wheel to lower down the intermediate plate and withdraw the lace which has been pressed, and thereby insert a fresh piece. By the fore-mentioned arrangement great pressure can be applied with a small amount of friction, and the power can be readily increased by lengthening the lever; and as the saving of labour is the chief desideratum with all machinery, the combination of the two wedges effects that object in traversing the plate through the necessary distance in the manner described.

In the machines which have been constructed for other parties in Hamilton, various means have been used for giving pressure, some having a screw and lever to press down the steam-chest on a fixed table, and others working up an intermediate plate against the steam-chest by means of a screw driven by a wheel and pinion in connexion with a smokejack-screw ; while others, again, have adopted the Bramah press for affording pressure, and which is probably the least calculated of any of the plans to afford satisfaction, as, independent of the time required in applying the pressure, should the valves not keep perfectly tight, the pressure relaxes; and, as there ought to be little or no elasticity in the frame of the machine, a very small escape of water entirely relieves the pressure ; and in these machines the application of pressure, so soon as the lace is inserted below the steam-chest, is a matter of much more importance than the mere saving of time, as it requires a sheet of moist cloth or paper to be spread above the piece of lace, and when the pressure is not expeditiously applied, the moisture is evaporated, and the lace thereby imperfectly pressed. In the other machines there is also a great loss of time before the steam-chest gets regularly heated, owing to there being only one pipe attached for the purpose of carrying off the condensed water, and which confines the circulation of the heat to the space between the inlet and outlet pipes, consequently the other parts of the steam-chest are slowly heated; but when the steam is delivered into the centre of the chest, with an outlet at each of the corners, the heat is then speedily and regularly disseminated through the whole chest. The two tables, with the apparatus for shifting the boards on which the lace is spread, is also original, as in the other machines the boards are inserted and withdrawn by the hand—rather a tedious process, as it requires some trimming when the boards are smaller than the steam-chest to place them in the centre of the machine.

In regard to the satisfactory working of the machine, and the saving of labour effected by it, in addition to the superior finish given to the lace compared with the old method, the proprietor, Mr. M'Arthur, will in a few days supply the requisite information.

I am, Sir, &c.
ROBERT M'EWEN.

To the Secretary of the
Society of Arts.

High Mark, near Stranraer,
April 6, 1843.

SIR,

I HAVE to acknowledge the receipt of a note from the Society, stating that the consideration of my machinery for pressing lace had been postponed on account of the drawings not having been forwarded, and, on receipt of the note, I immediately wrote to Mr. M'Arthur, to whom I had sent the plans to be forwarded to London, stating the circumstances; and on calling yesterday at the post-office, I found a letter from that gentleman, enclosing the accompanying letter, which I beg to submit to the Society in testimony of the merits of the invention ; and as Mr. M'Arthur is at present in London, you will ere this have received the drawings from him, and he has also kindly offered to call on you, and supply any other information that may be necessary regarding the matter.

The enclosed letter would have been sent sooner, but, owing to my residing at a distance of eight miles from the post-town, letters often remain for some days at the office until they are called for.

I am, Sir, &c.

To the Secretary of the Society of Arts.

ROBERT M'EWEN.

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38 *Queen Street, Glasgow,*
March 30, 1843.

SIR,

IN answer to your inquiries regarding the operation of the pressing machines you invented for me, I have great pleasure in stating that they fully answer all the purposes intended.

Formerly, by means of the common smoothing-iron, one person could press twelve pieces in a day. The occupation was a very unhealthy one, and the goods were very frequently spoiled in consequence of the difficulty of maintaining the irons at a proper temperature.

By means of your machine one person can finish two hundred pieces daily. The occupation is healthy, the finish is much superior to that by the irons, and the temperature being constantly equal, no goods are spoiled. In one word your machine is invaluable, and had it been secured by a patent, it would have realised a handsome return. But it will afford me infinite pleasure to call, when in London, on the Secretary of the Society of Arts, and shew specimens of my goods before and after they have received the finish of your machine, which, I am convinced, would be more satisfactory and more in your favour than any written recommendation.

It consists with my knowledge that, since you invented and fitted up the first machine for me, the irons formerly in use have been completely laid aside, other manufacturers having availed themselves of your very important invention.

I am, Sir, &c.

To Mr. ROBERT M'EWEN. D. M'ARTHUR.

High Mark, near Stranraer,
May 5, 1843.

SIR,

IN answer to your inquiry concerning what parts of my apparatus for pressing lace-goods were of my own invention, and whether some parts have not already been applied to machinery for other purposes, I beg to state that, with the exception of the parts of the machinery which are common to machines in general, the arrangements and details of both the machines were of my own invention, aided by suggestions afforded by various contrivances formerly in use, which I shall here state for the satisfaction of the Committee. Drawing No. 1, the plan of the first machine, was suggested and made to operate in imitation of the original method of pressing the lace by the common smoothing-iron; and the various contrivances requisite to effect the complete operation of the machine were, like most other matters of that kind, principally suggested by the necessity of the case. The movable and expanding joints of the steam-pipes were copied from a somewhat similar contrivance in common use in the gas-pipes used in workshops, and the sliding table, and the means employed for moving it by a roller and chain, though similar to a plan now much in use for working planing machines, was original on my part. Drawing No. 2, though similar in the use of a steam-chest to other machines made for pressing lace after the application of my first machine, yet differs in construction and operation from any machine I ever saw or heard of;

and though some of its parts bear a resemblance to contrivances already in use, they are quite different in their mode of application to the contrivances I allude to; for example, the wedge or camb of the machine bears a resemblance to the camb of a punching machine, and to it I am indebted for the original suggestion; but the camb of the lace-machine is quite different in its form and mode of operation to the camb of a punching machine.

The lever and ratchet-wheels for applying extra pressure bear a resemblance to many contrivances of a like sort; for example, the ratchet-drill in common use for boring holes in confined places, and Tyzack and Dobson's patent ship's windlass, and to the latter I am indebted for the original suggestion; but the mode of connecting and detaching the lever from the ratchet-wheels, and making it serviceable in applying and maintaining pressure in the manner shewn by the drawings, is entirely original; and, from the ease and speed with which the pressure can be applied by the fly-wheel and lever acting on the camb, constitute the most important and original parts of the machine; and in these days, when so many contrivances have been invented, scarcely any piece of machinery can, strictly speaking, be claimed as original, seeing it must be composed of parts previously known, though probably modified to suit new arrangements. The only legitimate claim of originality must consist in the application of machinery to new purposes, and on that I found my claim as the inventor of machinery for steam-pressing lace goods, and am only indebted to the ingenuity of others in so far as the fore-mentioned parts of the lace-pressing machinery bear a resemblance to those I have stated.

I am, Sir, &c.

ROBERT M'EWEN.

To FRANCIS WHISHAW, *Esq.*
Secretary, &c.